cosylab
CONTROL SYSTEM LABORATORY

MCS-8
The 8 axes motion control system

Rok Šabjan
rok.sabjan@cosylab.com

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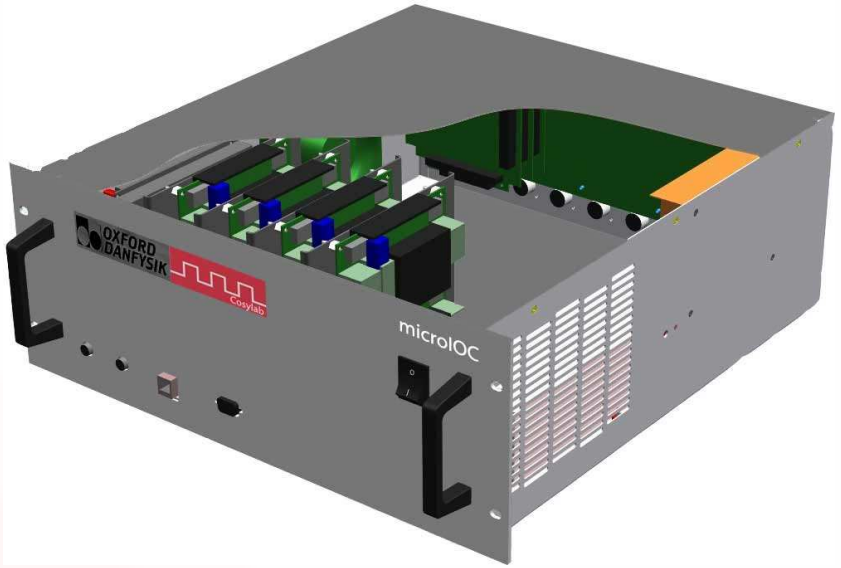


What is the MCS-8?

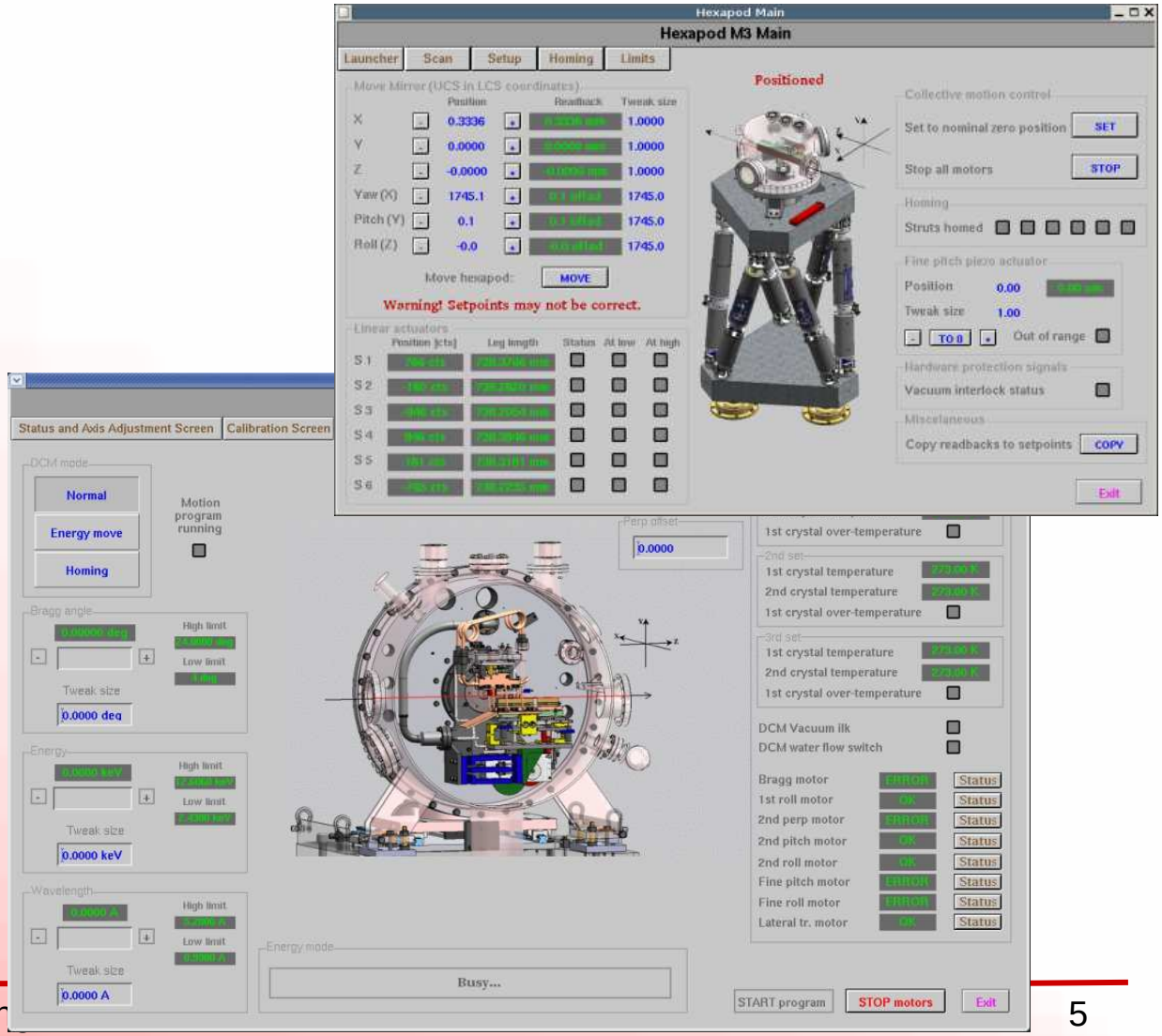
- 8-axes motion controller box (by Cosylab and Oxford Danfysik (UK)) that includes:
  - Commercial motion controller (Delta Tau Turbo PMAC2)
  - All the I/O units, including power drivers
  - Embedded **Cosylab microIOC** with Linux and EPICS
- What can we drive with it?
  - All kinds of motors: stepper, servo, pico, piezo…
  - Inputs for limit switches, home switches, encoders
  - Digital and analog I/O
- Why buy MCS-8?
  - New functionality requirements on beamlines demand more complex motion controllers
  - We want to provide the customer a fully integrated solution with the necessary features and plenty of room for additional development

Main benefits

- Control **any** type of motor (power driver type has to be selected upon purchase)
- All advanced features of the Delta Tau controller:
  - Fast acting PID control with multiple co-ordinate systems and a variety of flexible control algorithms.
  - Synchronized movement of multiple axes, also across several controllers
  - Reverse Kinematics capability.
  - Full PLC control with programming facility as standard.
- Reduce the installation **time** and **effort** (=**cost**)
  - Setup motor controls in a very **simple** way without giving up functionality
  - Reduced cabling (just bring in your motor, switches and encoder cables + Ethernet and power)
- Custom connector types possible

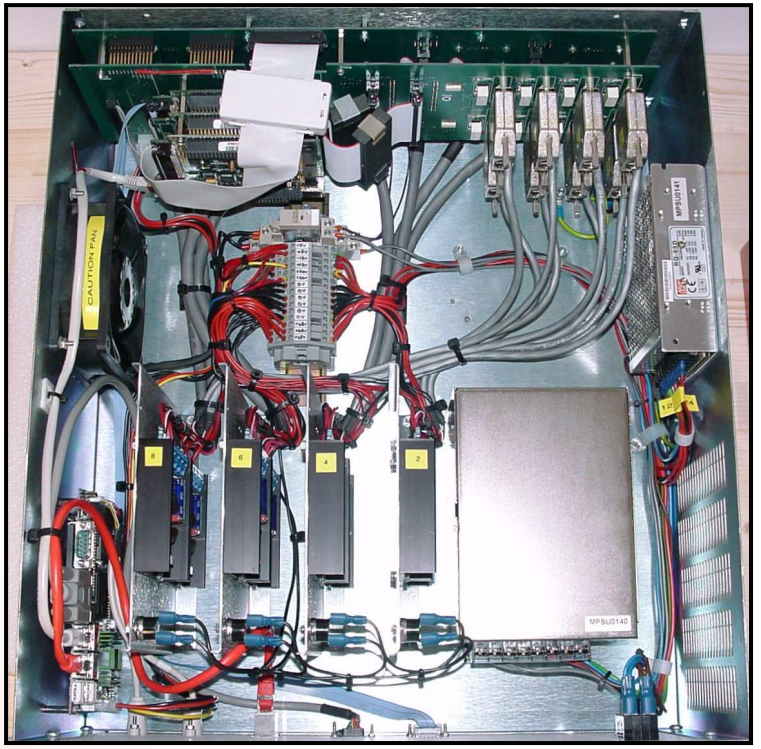
Where is it being used?

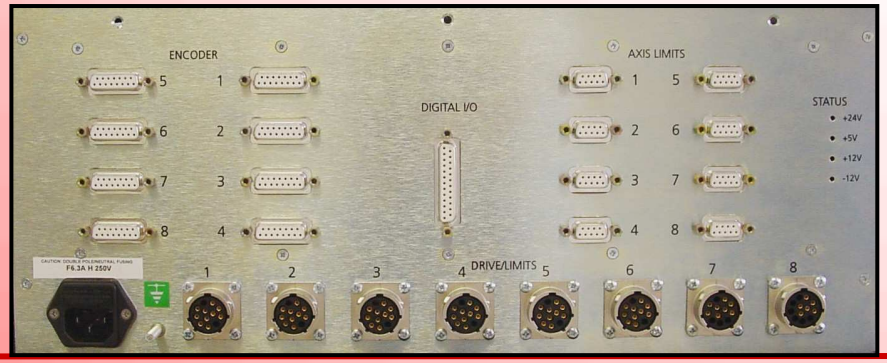
- Optical chicane (ASP)
- Hexapod mirror control (SLS) – migrated from VME system developed for Diamond
- Protein Crystallography beamline (ASP)
- Powder Diffraction beamline (ASP)
- Non EPICS projects:
  - INDUS (SPEC)
- More than 20 pcs already sold!



Hardware

- 4-U case
- 500W power supply
- Sufficient cooling (fans)
- Selectable motor drivers (external drivers possible)
- 4 additional analog inputs
- 8 programmable digital inputs and outputs





Software

- PMAC driver support is an upgrade of the TPMAC support package maintained at GMCA/CAT at APS
  - Only ASCII communication via Ethernet
- Most of the motor record features retained
  - e.g. soft limits, velocity, backlash, acceleration, direction, offset, resolution
- Support for all statuses from Delta Tau (many of them)
- Several different homing procedures implemented, new can be added
- All motors are "scanable" (make use of busy record) and thus fully compatible to be used with synapps tools
- Screens in EDM also done for all features
- Architecture: gone for simplicity
  - A careful balance between what is programmed in PMAC and EPICS
  - the motion control is left to the PMAC
  - Single motion, including running complex programs (e.g. special homing)
  - Lookup table (up to 7 motors)
- Special software for hexapod mirror control
  - Built on the Delta Tau inverse kinematics algorithms
- Integrates easily in the control system (all microIOC features)

Future plans

- We want to move to asyn driver based motor record
  - Right way to go
  - Trendy
  - Compatible with the universe
- All development from our projects will get fed into the MCS-8 software
- Power PMAC is a new product line from Delta Tau featuring Power PC and a RT Linux (most probably) operating system
  - We are looking how to best use it in new generations of MCS-8
  - Not before 2007

Cosylab is the distributor and integrator for Delta Tau for academic CS market

- Ask us for an offer when buying Delta Tau products
- We can provide additional services, also designing and/or implementing your control system
- You know us and we know you – a very good start!

DELTA TAU
EUROPA

Conclusion

- A motion control solution that easily integrates into control system
- Basic functionality working out of the box
- Custom requirements are easily implemented
- Available **now**
- For orders and enquiries please contact:
  csl-sales@cosylab.com
- CA Server in Java
  - We have secured ¾ of funding already (Gemini, DESY)
  - People would be interested in that (remember Kay's and Marty's talks)
  - Still looking for the last ~10k$